

# Microbead Platform Assay Process

**STEP 3**

Code and

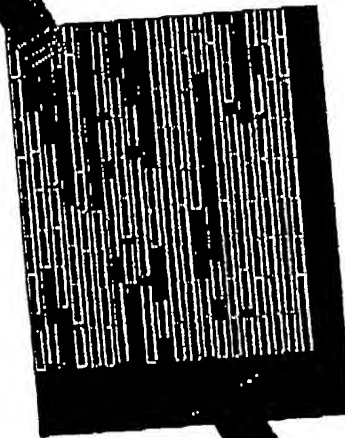
Fluorescence

Read-out in Solution



**STEP 2**

Beads self-assemble  
in groove plate



**STEP 1**

Beads

Hybridized  
in Solution



Data management  
& bioinformatics

**STEP 4**

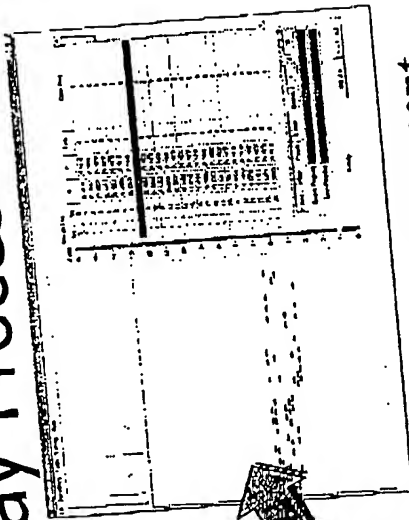


Fig. 1

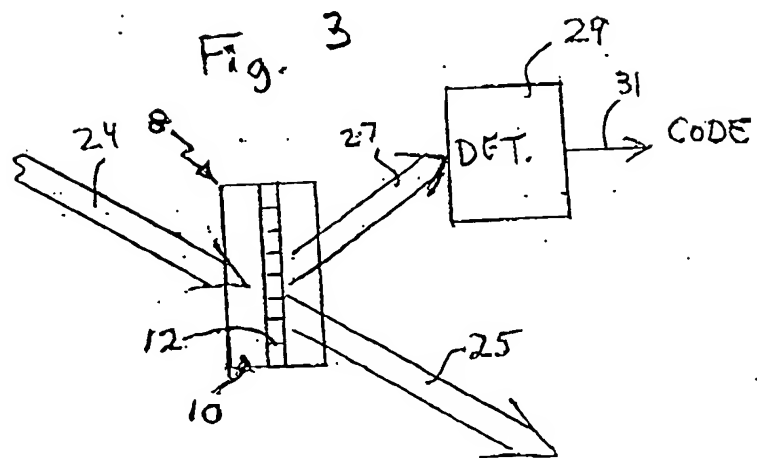
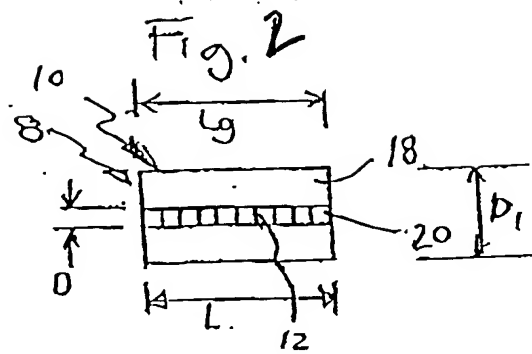
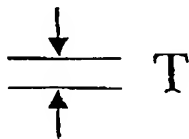
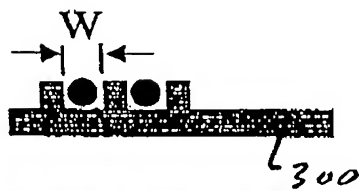
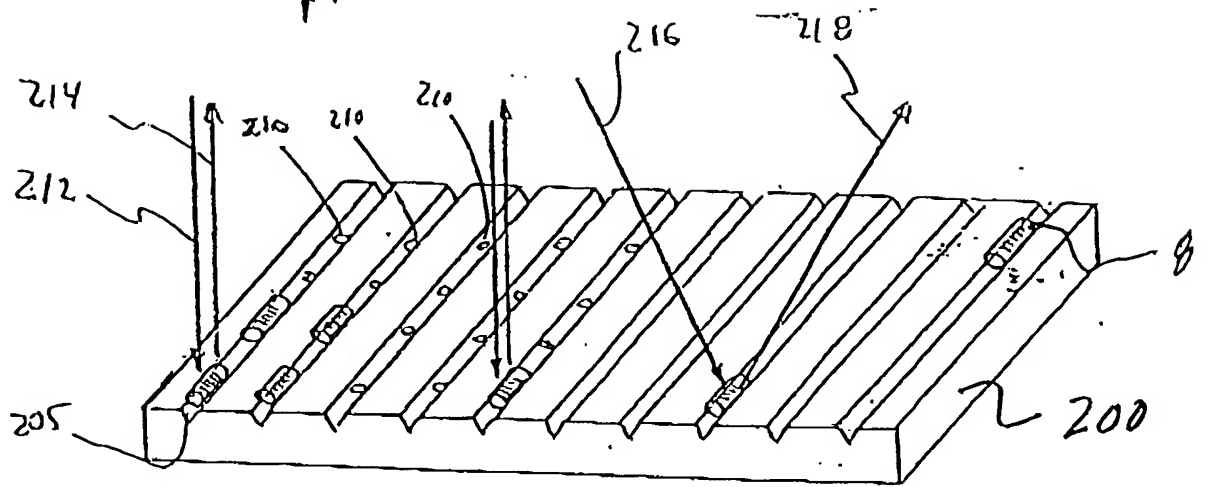


Fig. 4



$$0.5D < T < 1.5D$$

$$0.8D < T < 1.2D$$

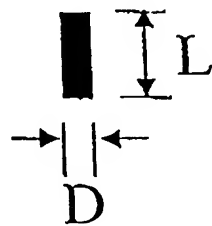
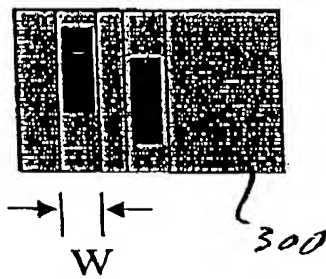


Fig 5



# Microbead Mapper Readings

- ① - Code = 41101
- ② - Code = 20502
- ③ - Code = 41125

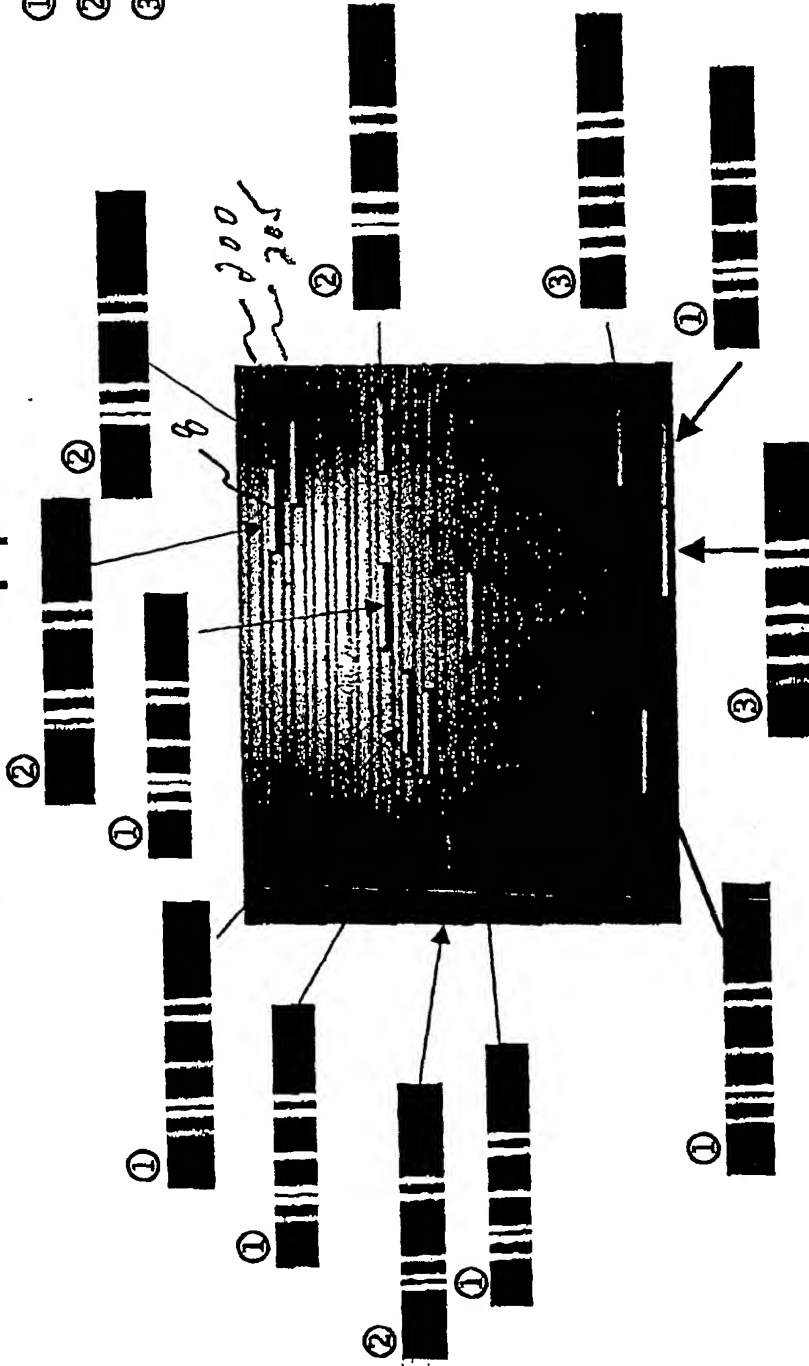
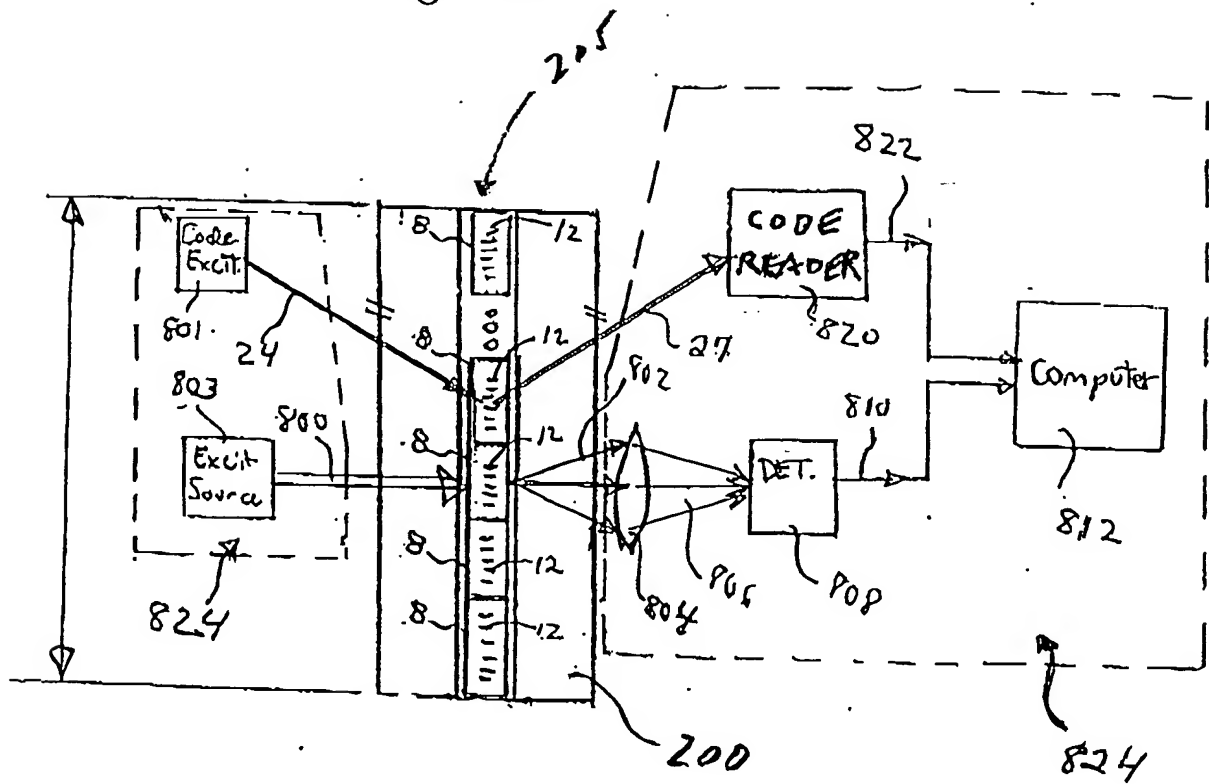


Fig. 8

- Three different codes in this set (16 bit, binary symbology)
- Each code different oligo attached

can have a

Fig- 8a



8b Open Plate Format 8d

~200

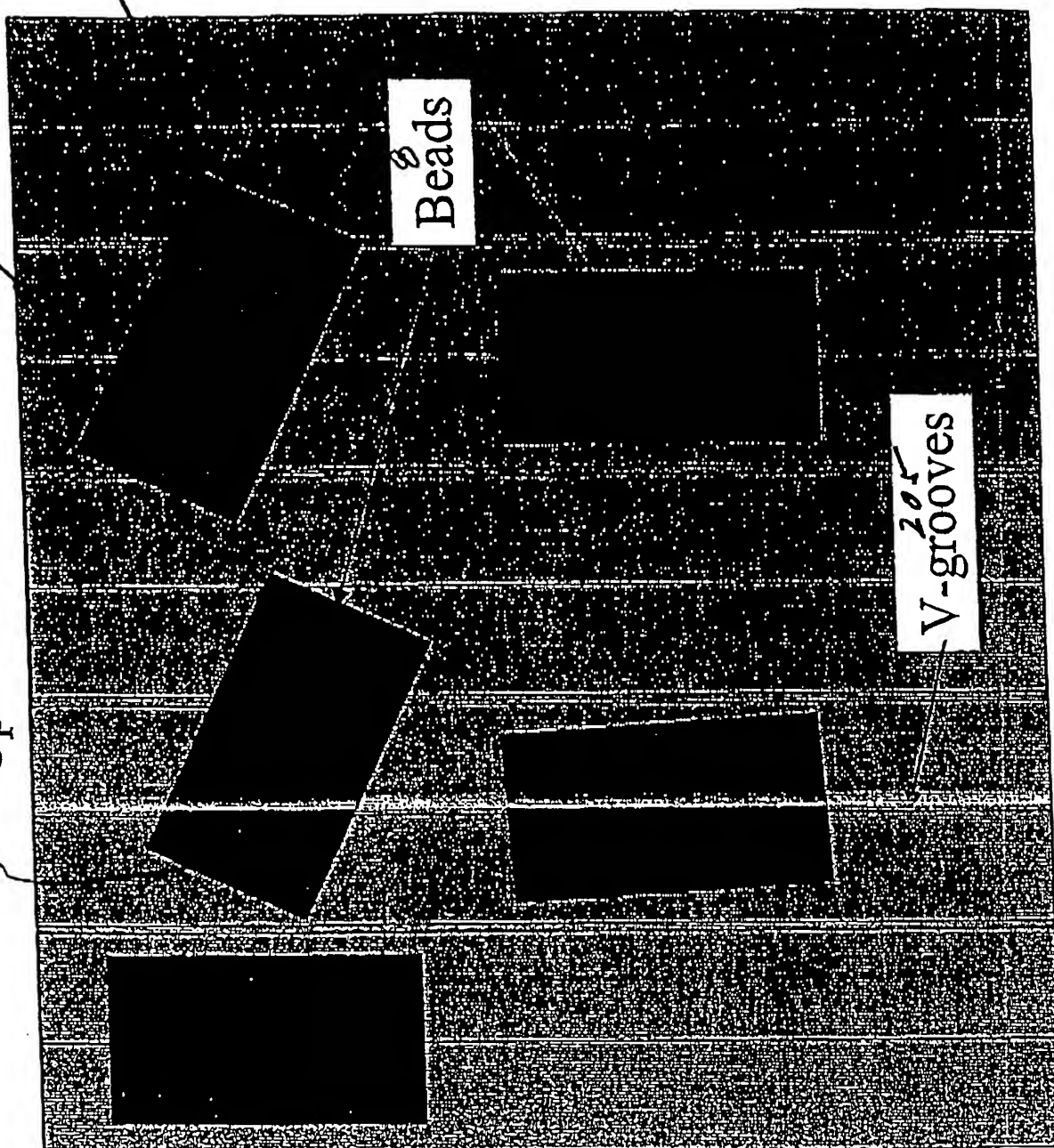


Fig. 89

ca. 05

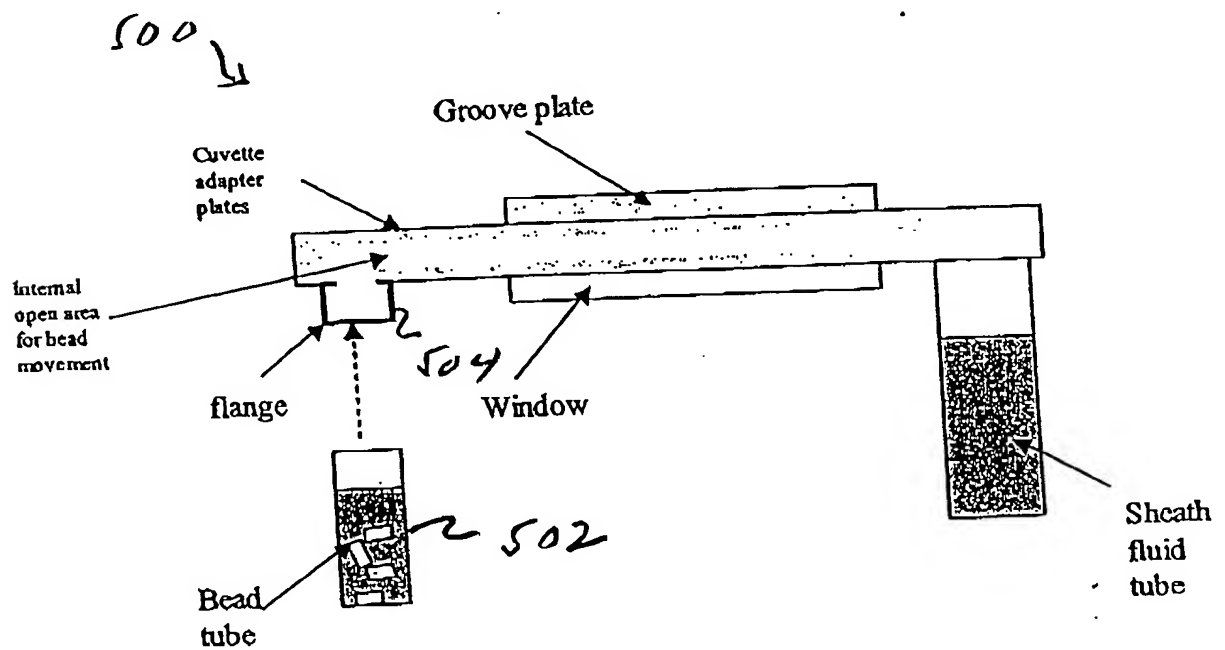


Figure 1 Starting point for handling microbeads for readout

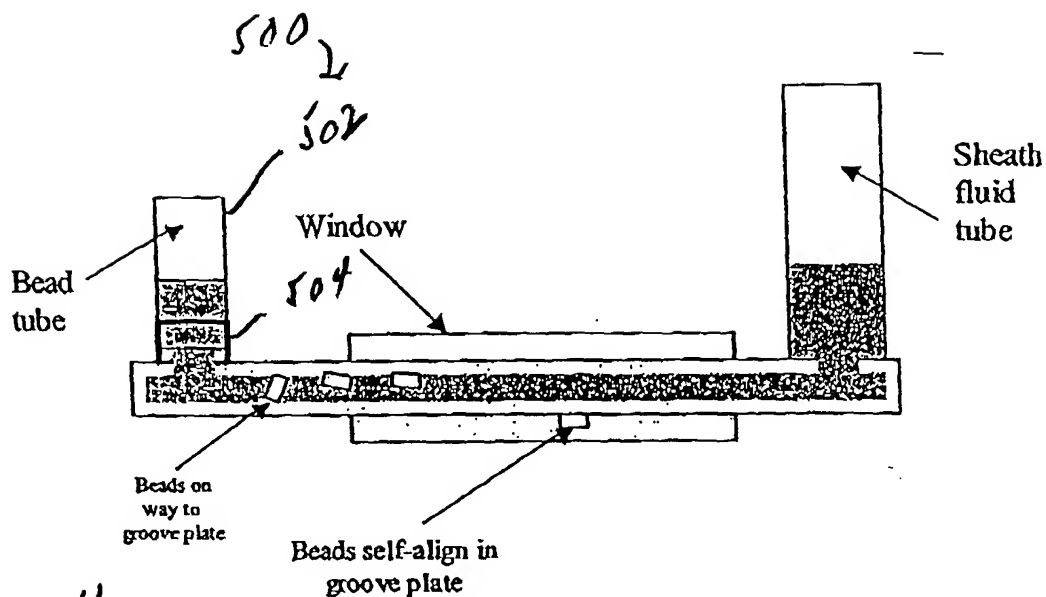


Figure 11 Second step in readout process. The cuvette is inverted and the beads flow onto the groove plate. The beads will naturally self-align in the groove plate with a small amount of rocking or agitation.

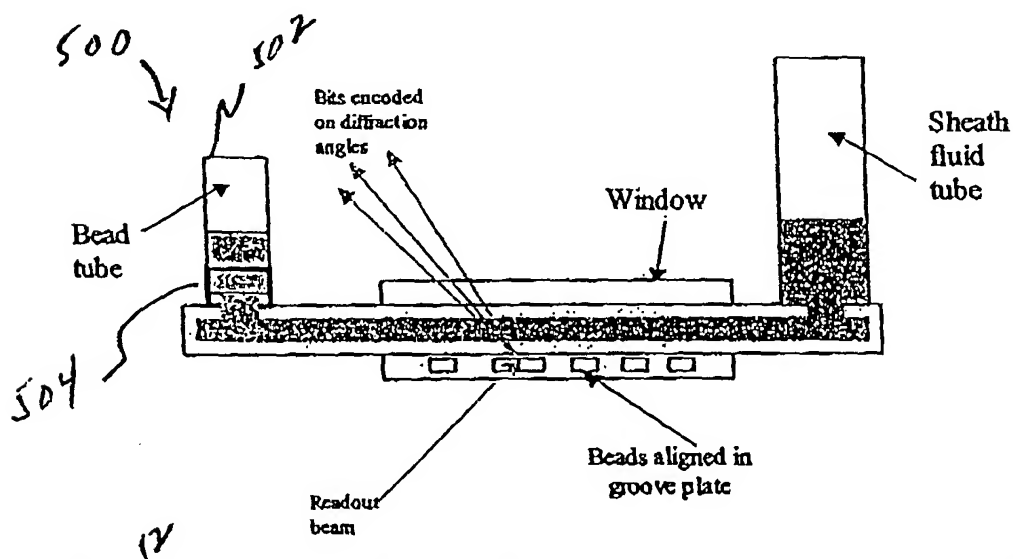
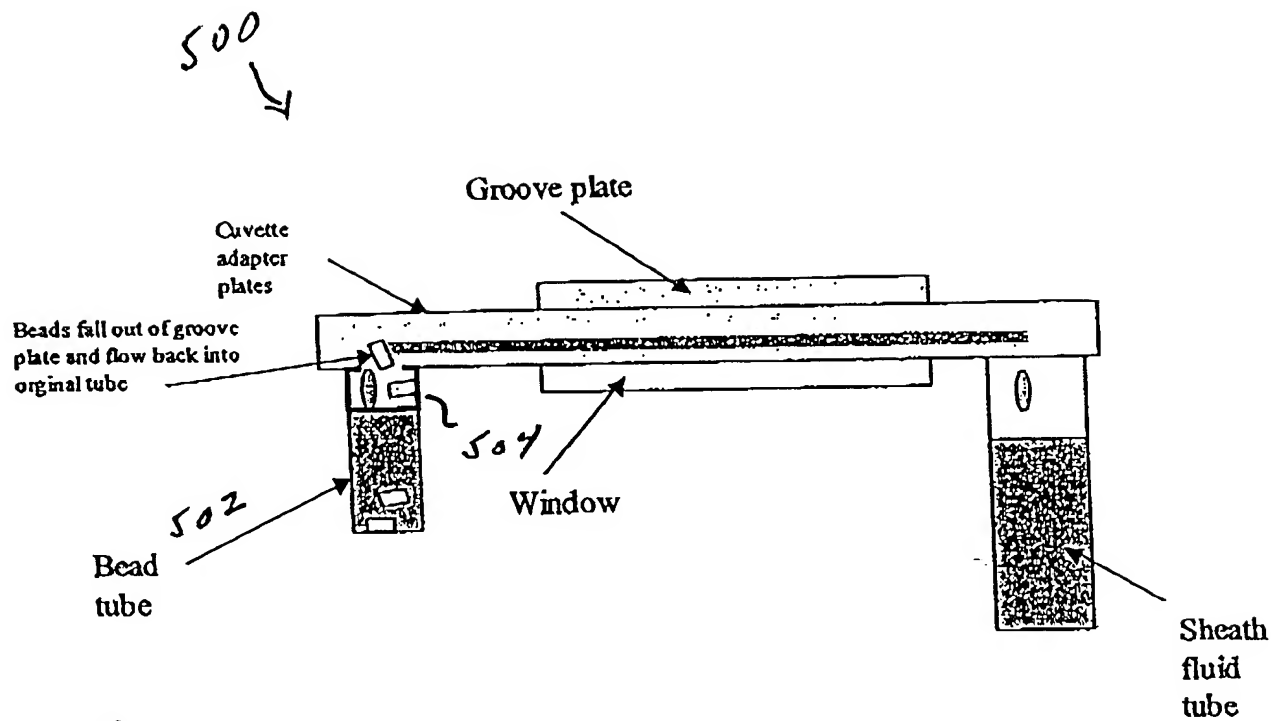
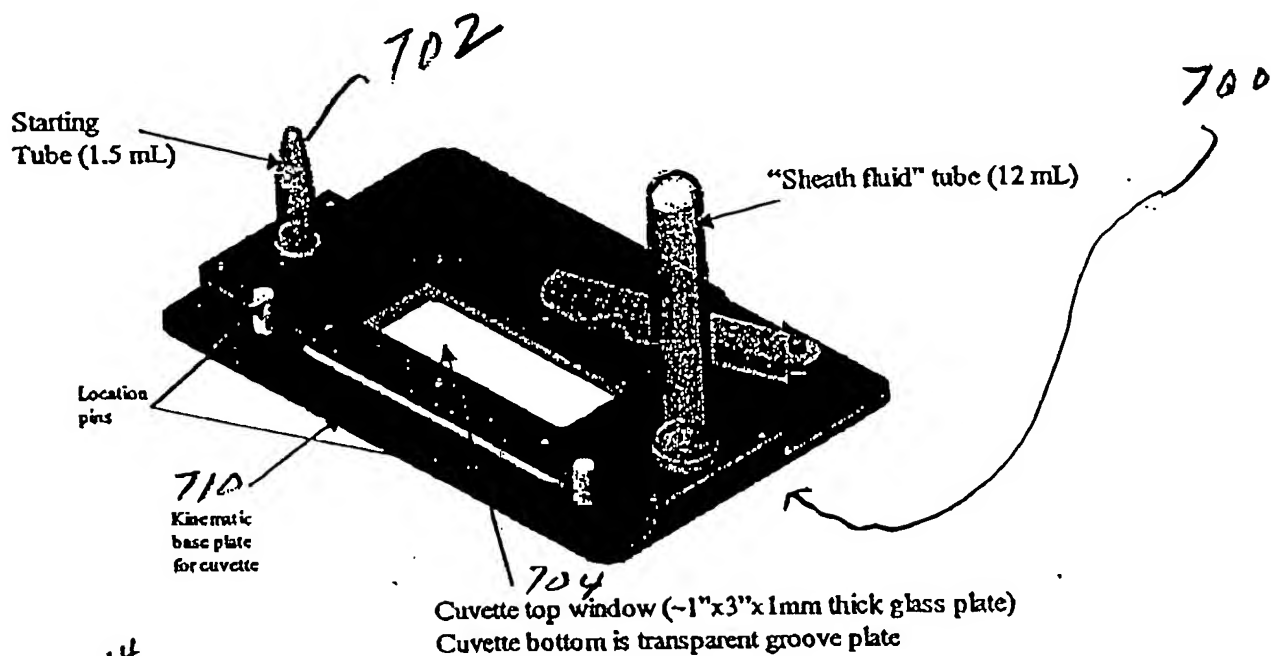


Figure 12 Readout step. The beads are all (or nearly all) aligned in the groove plate. The entire plate is moved (or the readout laser beam is scanned) in order to read the codes of each bead.



13  
**Figure 13** Final step. The cuvette is inverted to its original position and the beads flow back into the original tube.



14  
**Figure 14** Example of cuvette showing its mount on a kinematic base plate.

009022

Design 2  
Port for  
Fluid fill/empty  
Air port

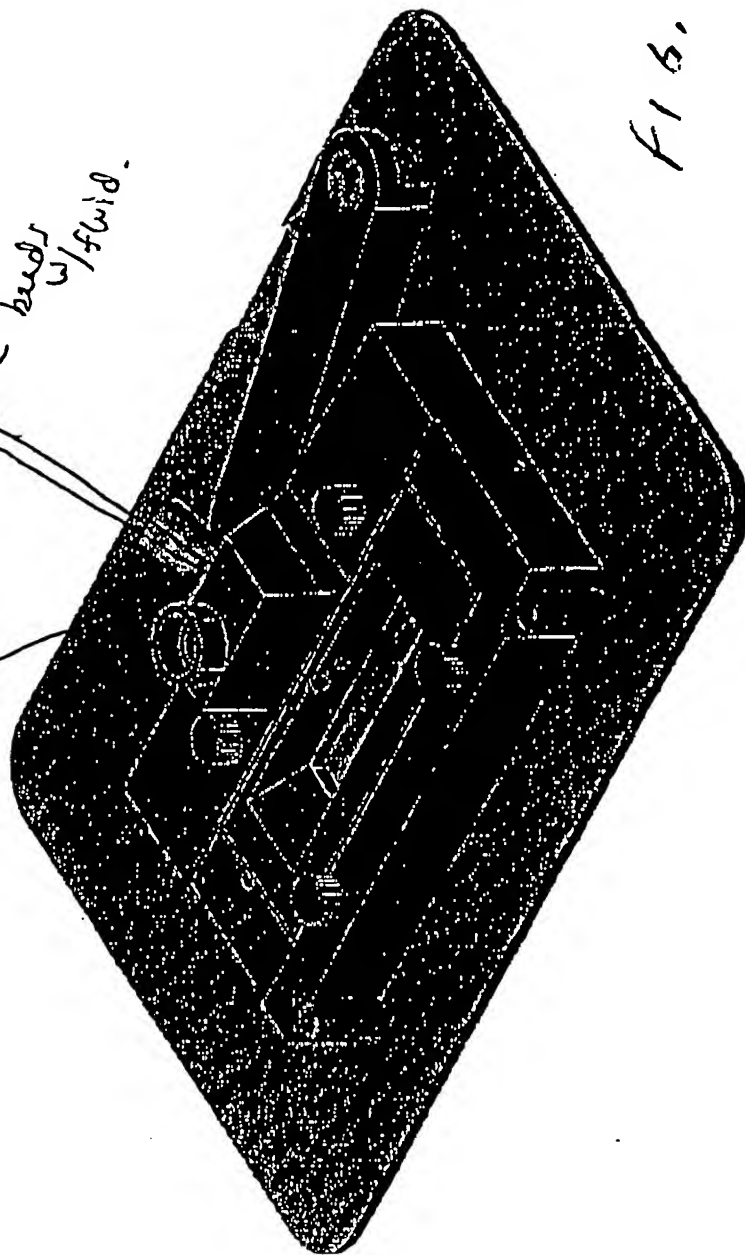
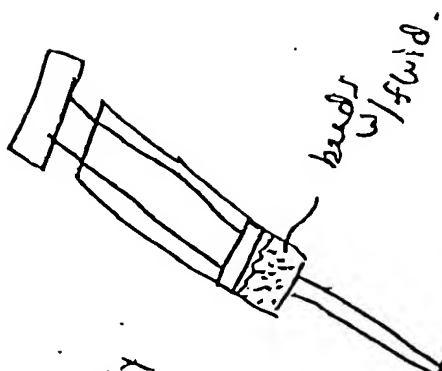


Fig. 15

0690 22

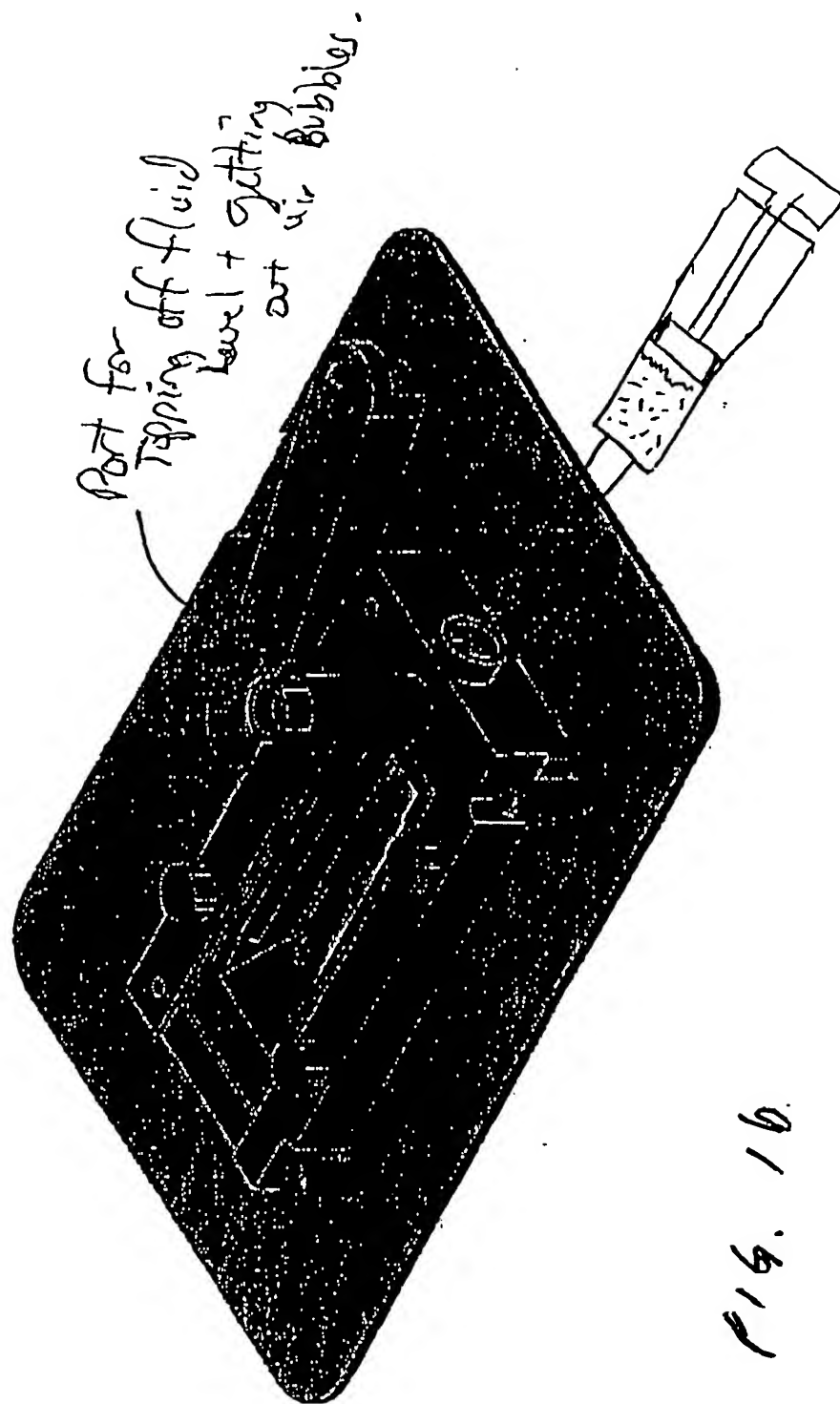
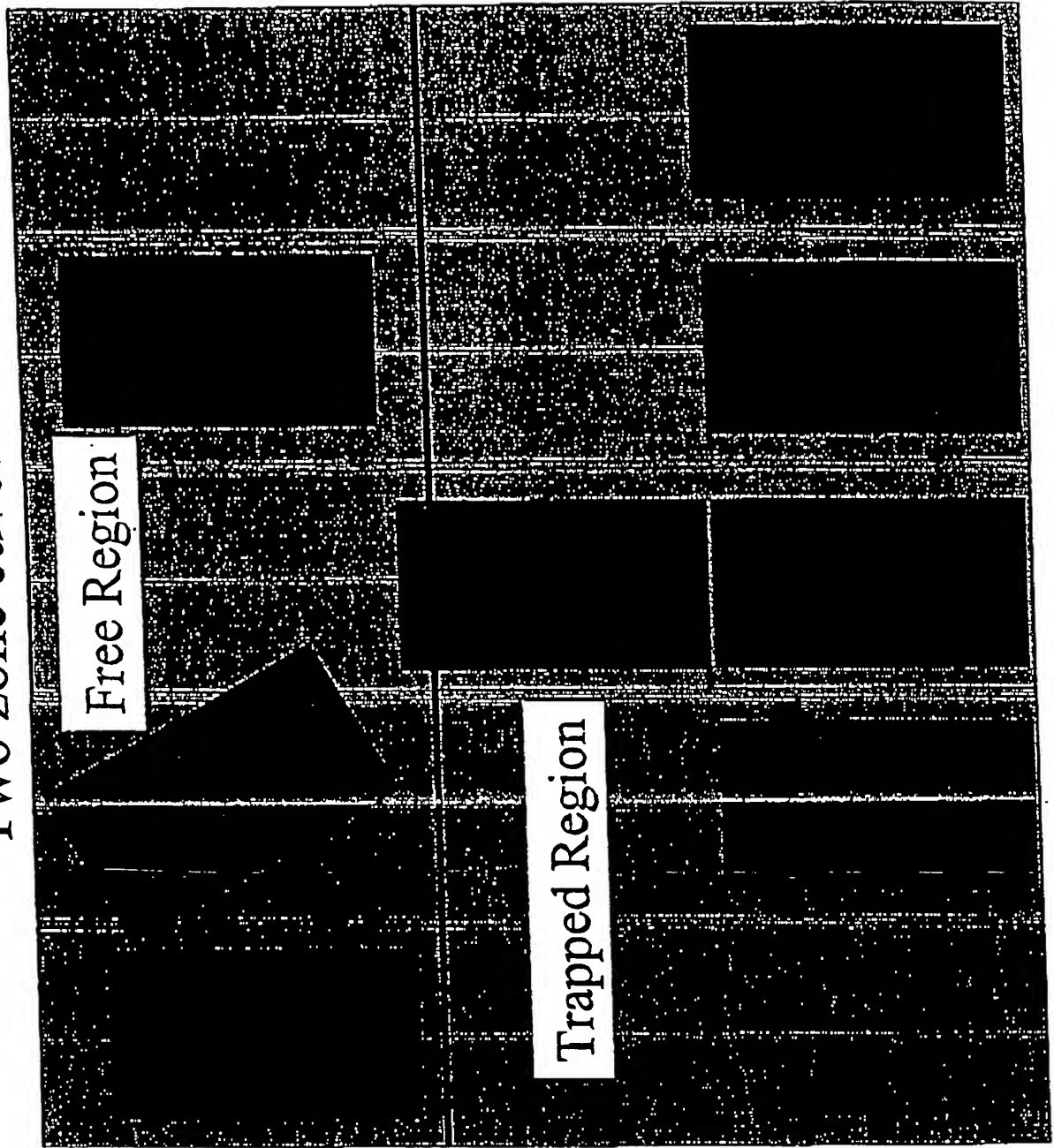


Fig. 16.

Two zone cuvette



G →

Fig. 17

020572

CR 0569

# Cytometer Method

Conventional Flow cytometer Reader (single pass)      Disk Cytometer reader (multi pass)

1000

900

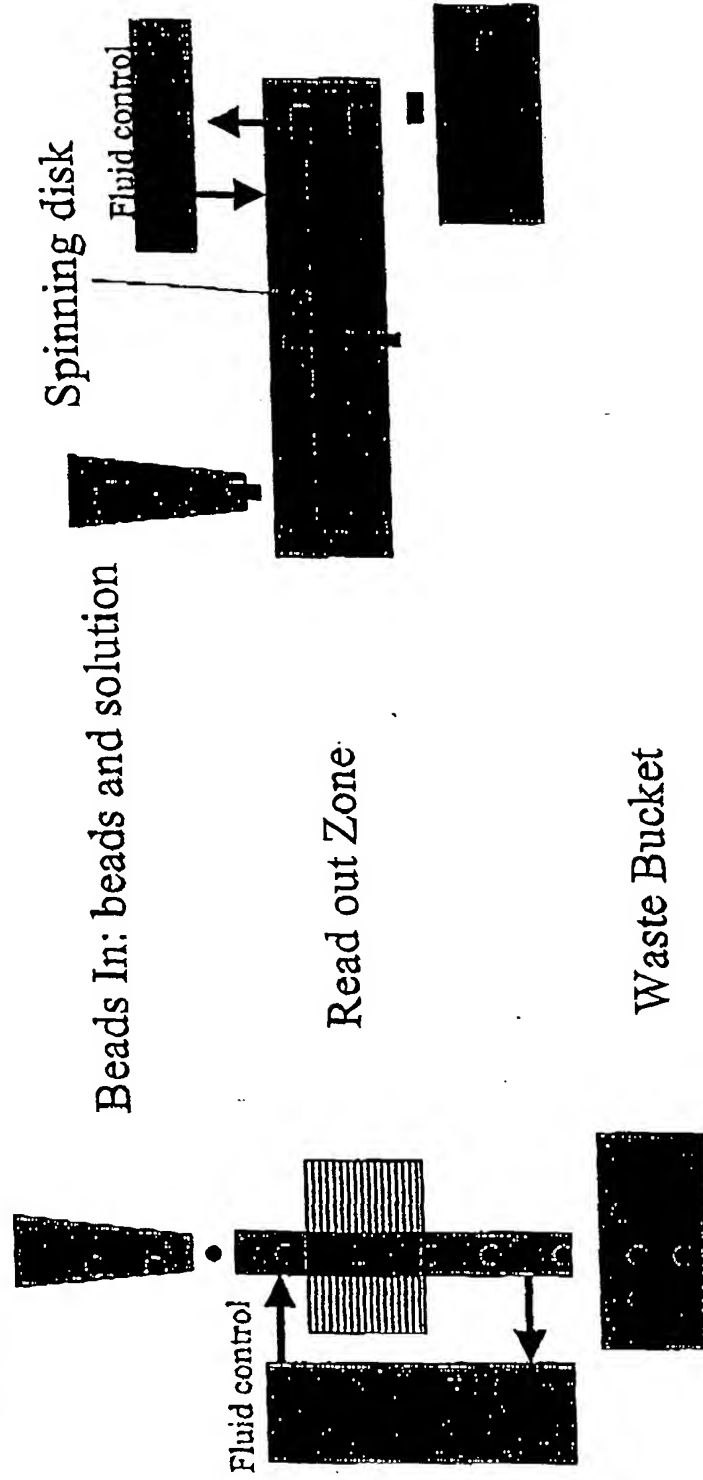


Fig. 18: (b)

(a)

Fig. 19  
Disk Cytometer

585022

grooves can be oriented in any desired direction

Plasma groove plates positioned in disk platform rotating

"Cytometer-like" bead reader

Bead Loading Zone 1256

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

12048

Bead Removal Zone 1258

1254

1254

1254

1254

1254

1254

1254

1254

1254

1254

1254

1254

1254

1254

1254

1254

1254

1254

1254

Read out Zone 1260

1252

1252

1252

1252

1252

1252

1252

1252

1252

1252

1252

Window in contact with fluid 1262

1260

1260

1260

1260

1260

1260

1260

1260

1260

Circumferential, concentric grooves

(v)

1286 bead loading area

Radial Groove 1280

1282

1282

1282

1282

1282

1282

1282

1282

1282

1282

1282

1282

1282

1282

1282

1282

1282

1282

1282

1282

1282

Wall 1290

1284a

1284b

1284c

1284d

1284e

1284f

1284g

1284h

1284i

1284j

1284k

Wedge shape spacer keeps channel at a constant gap width.

Tight bead packing due to rotational forces

(c)

6850 W

MECHANICAL  
IRIS - PROVIDES  
VARIABLE APERTURE  
FOR BEAD ACCESS  
TO GROOVES 1402

# Disk groove plate with radial channels for spin drying

1300  
CATCHER  
CAN MOVE  
RADIALLY  
OUTWARDLY  
IF DESIRED

1300  
- BEAD CATCHER  
FOR REGULATION  
LOOSE BEADS  
CAN BE  
MOVABLE

"Cytometer-like" bead reader.

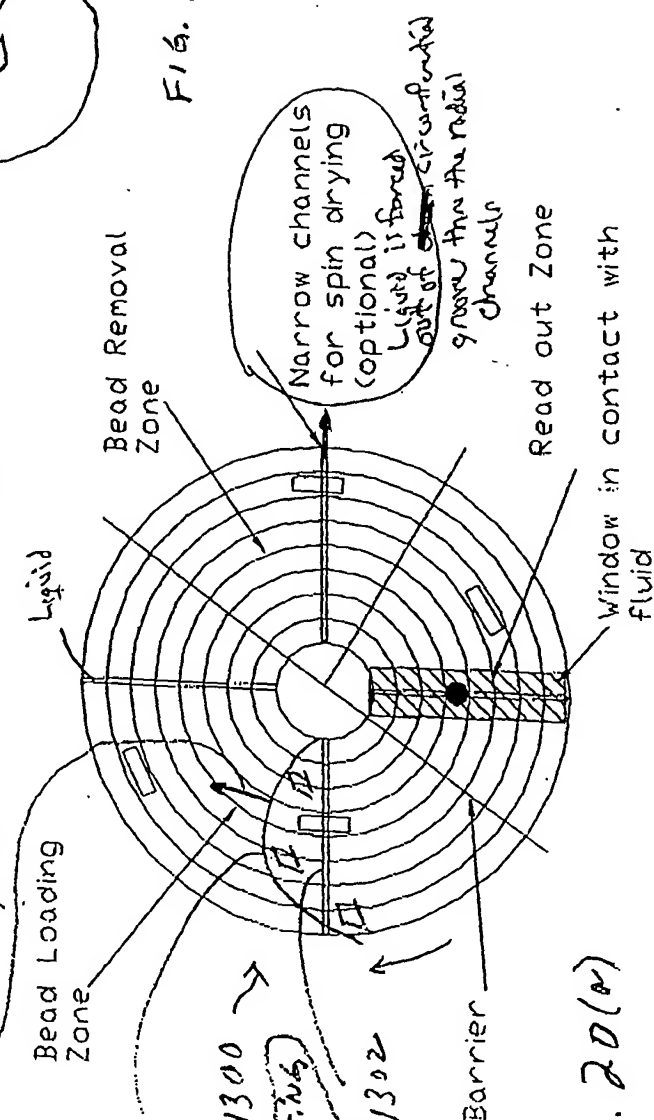


Fig. 20(b)

Fig. 20(a)

589

450 x 65 um beads on SU8 groove plate

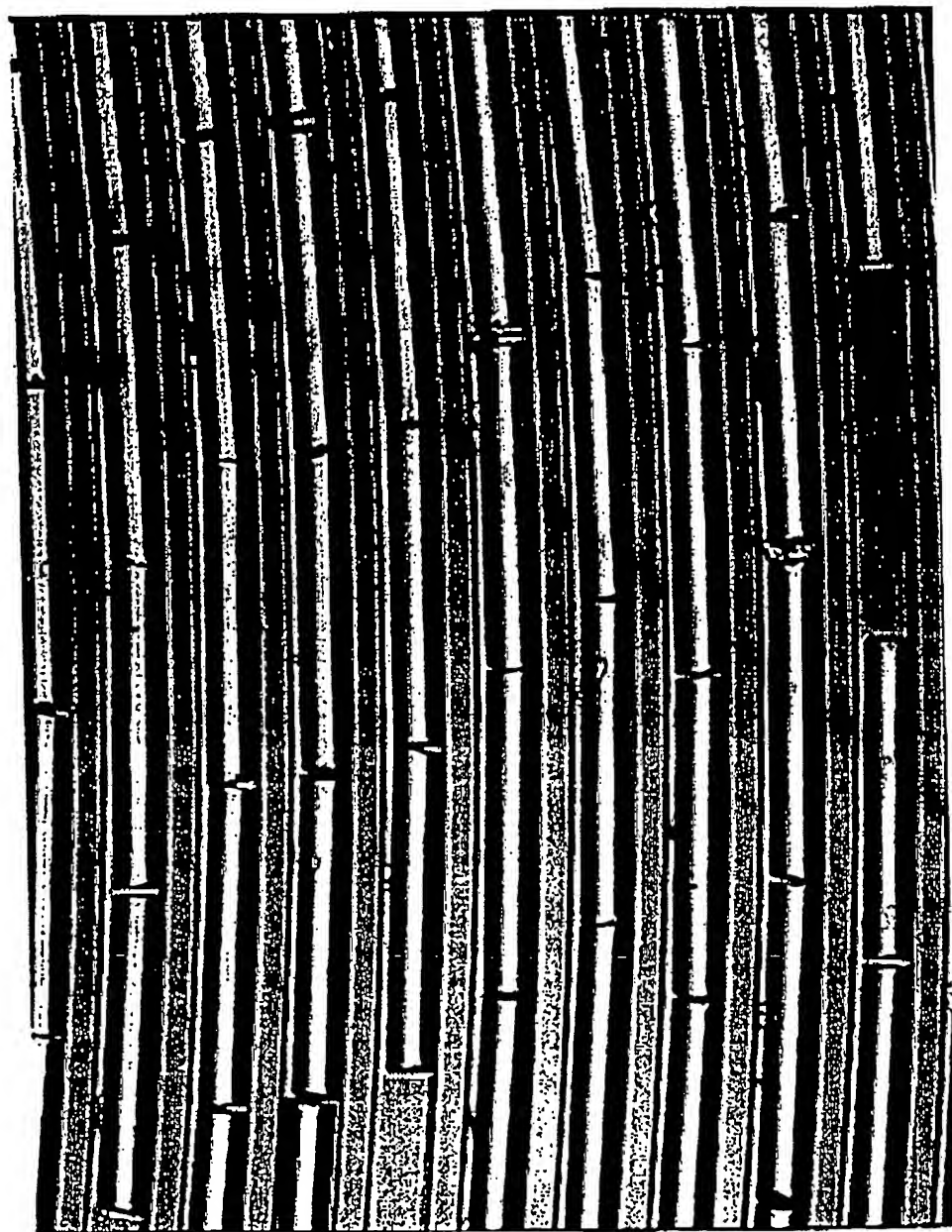
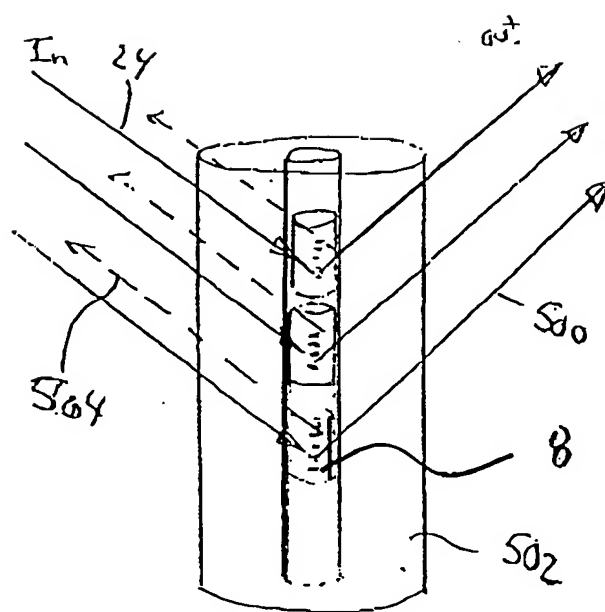


Fig. 21

Fig. 22



→ Alternative to planar/plate alignment forms  
 the beads may be aligned in a tube, fluid may  
 flow thru the tube to move beads along tube.  
 "Flow Cytometer"

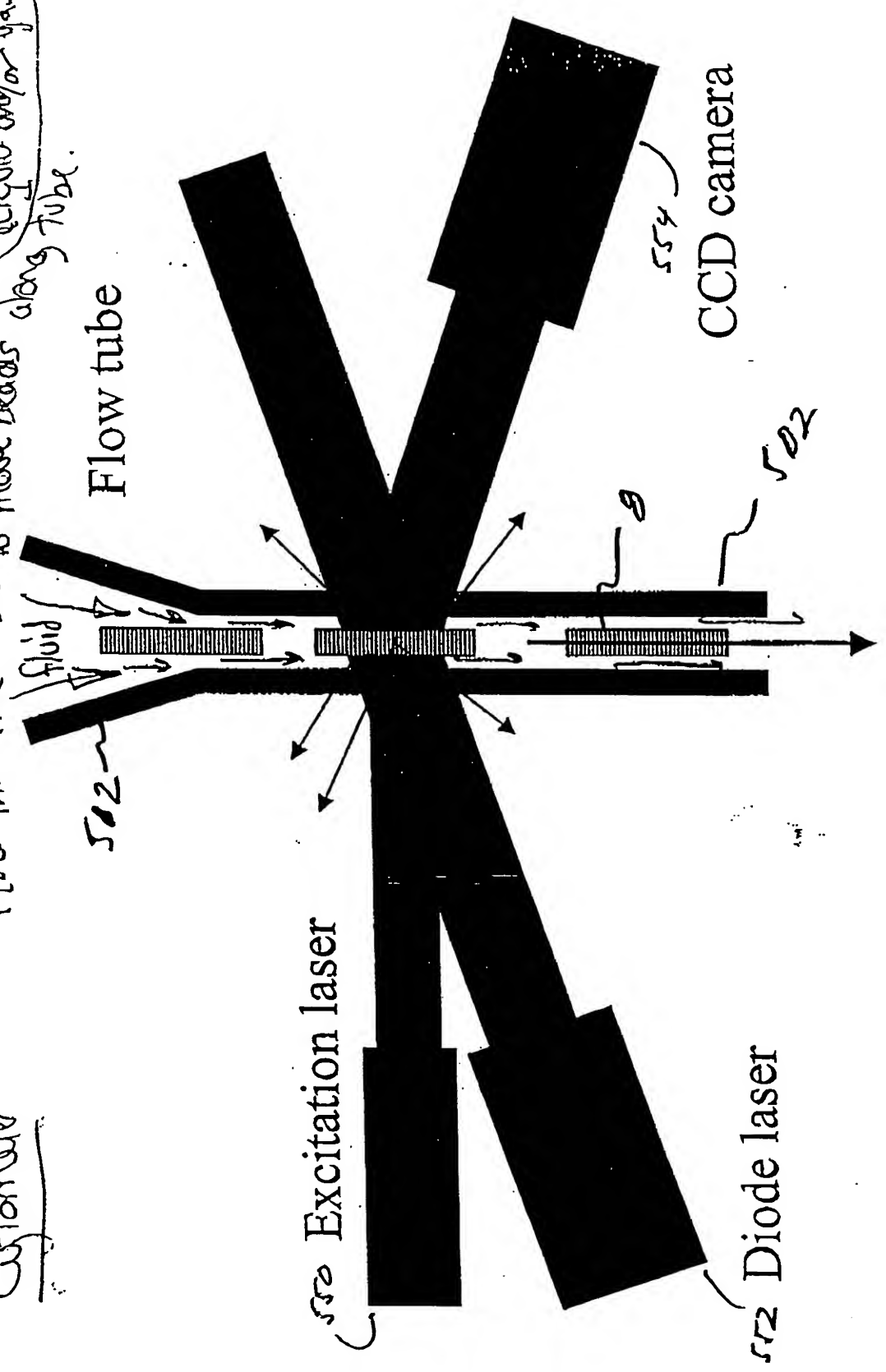


FIG. 23

FIG. 24

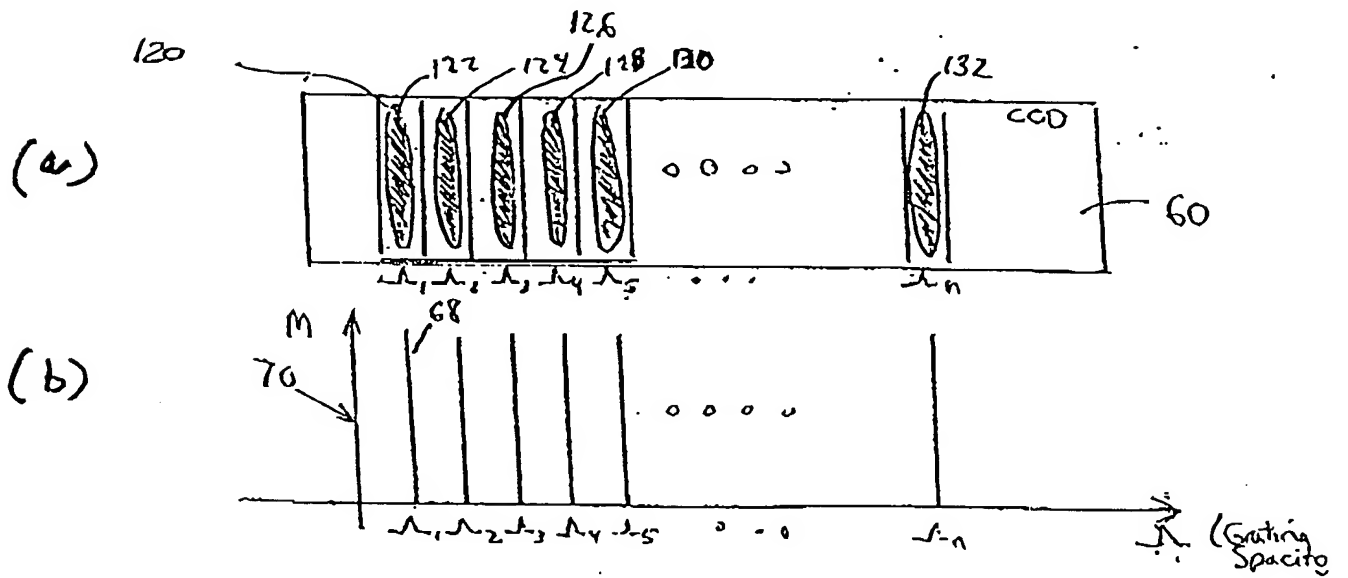
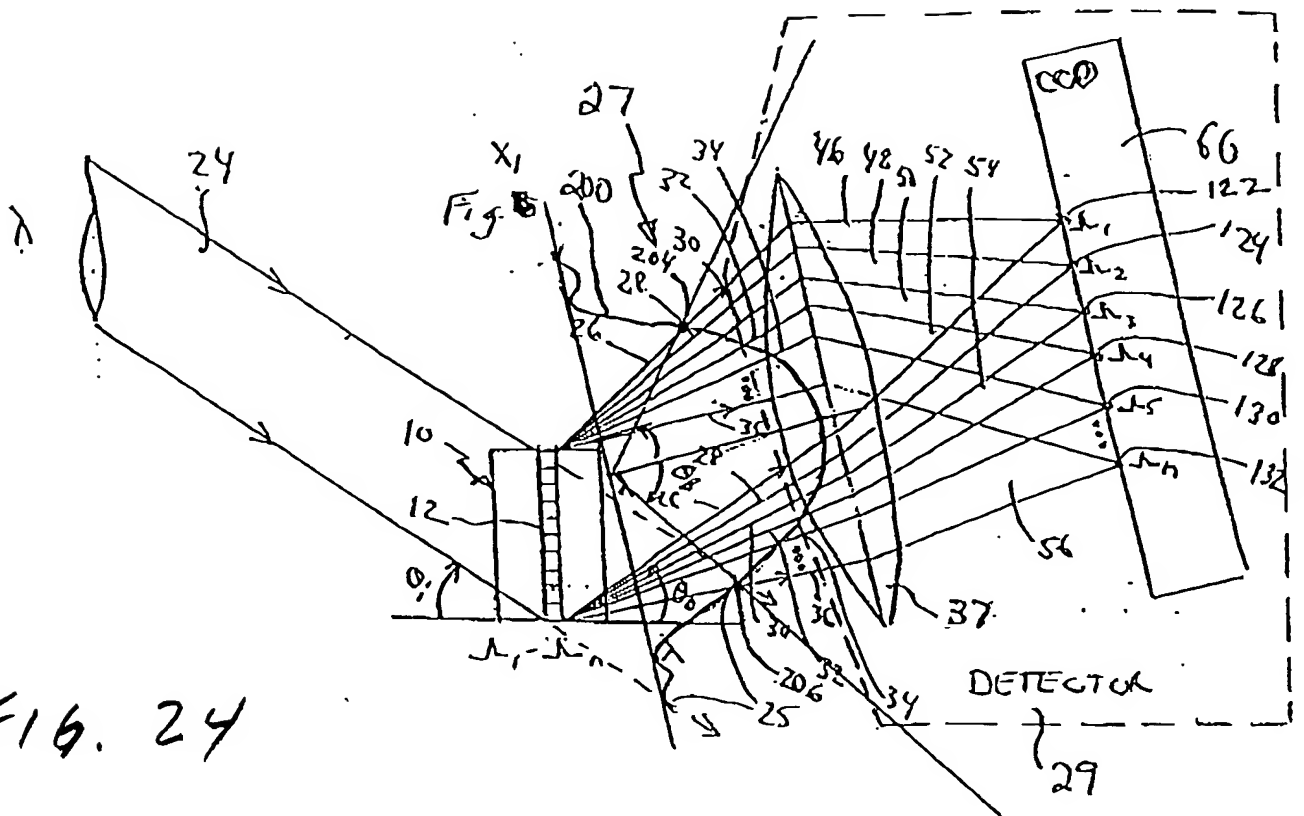
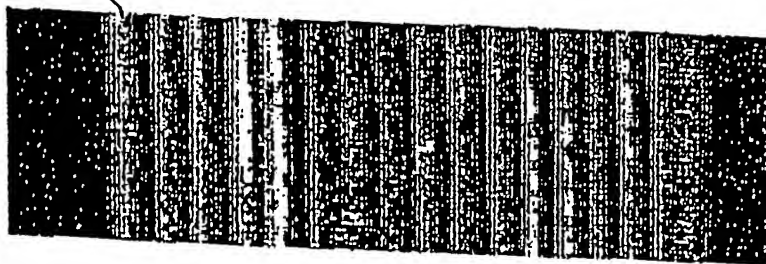


FIG. 25

Fig. 26

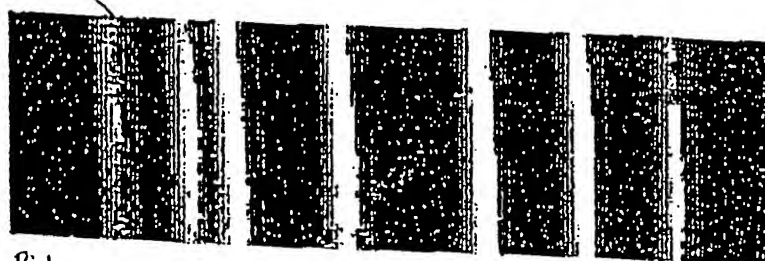
CC-~~0000~~

89 17 bits turned on



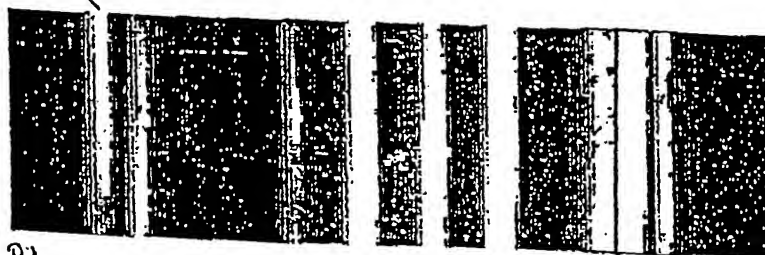
Bits: 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
(a)

89 7 bits turned on



Bits: 1 0 1 1 0 0 1 0 0 0 1 0 0 1 0 0 1  
(b)

89 9 bits turned on



Bits: 1 1 0 0 0 1 0 1 0 1 0 1 0 0 1 1 1  
(c)

Fig. 27

CC-~~6448~~

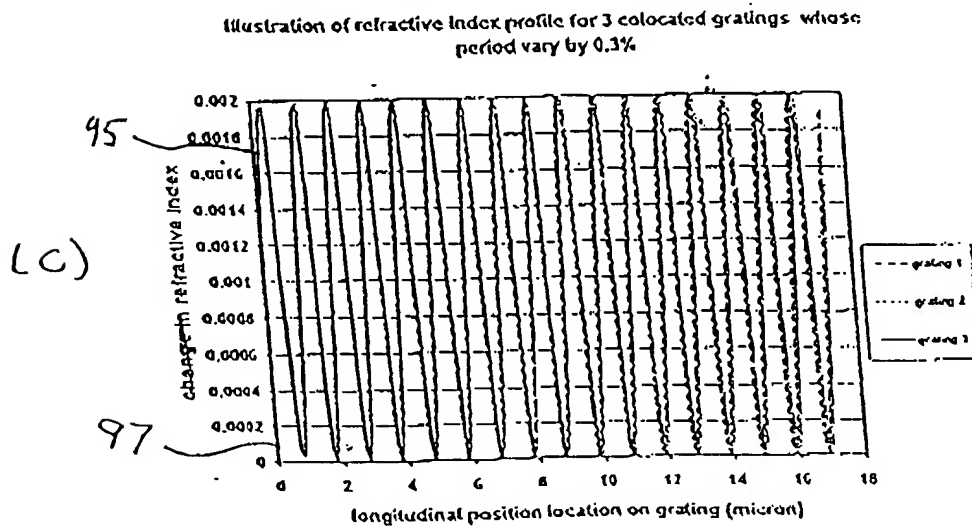
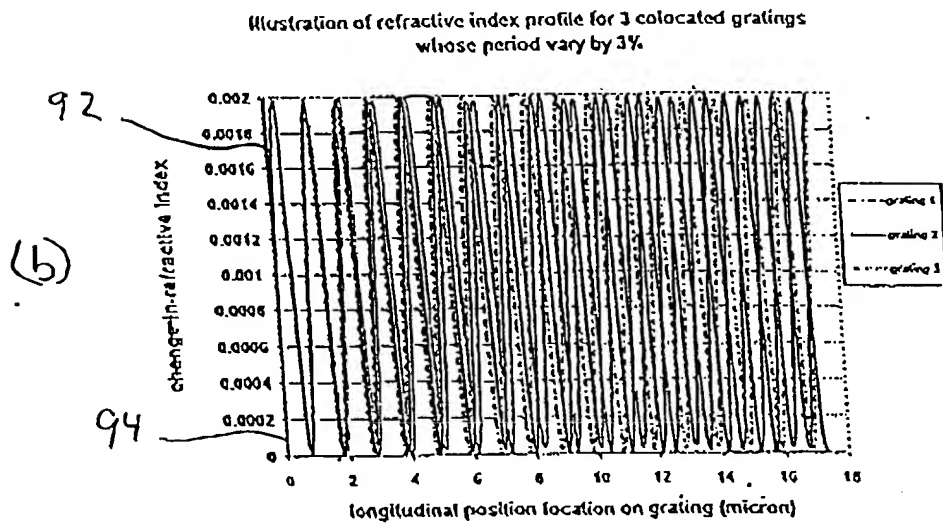
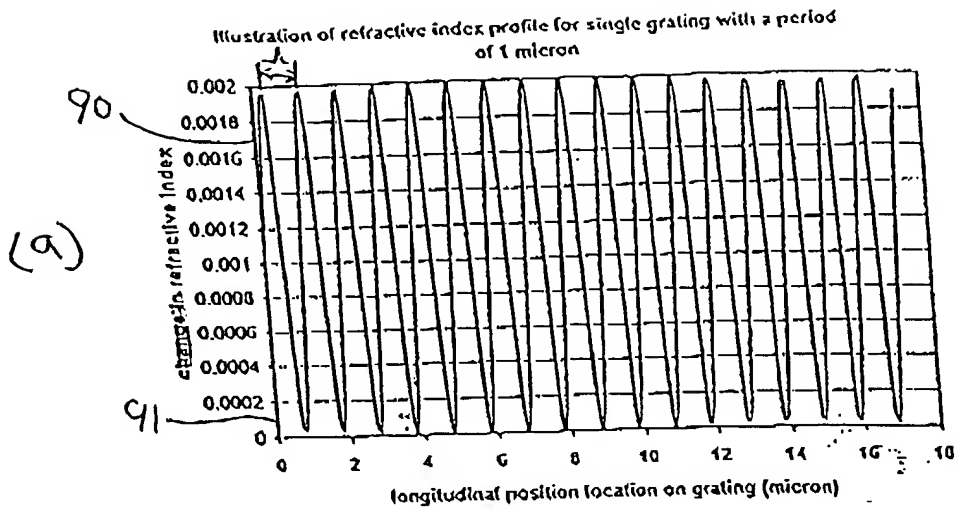


FIG 27

CC-0048

(d)

Index modulation caused by superposition of 3 gratings where the pitch between each grating varies by 3%.

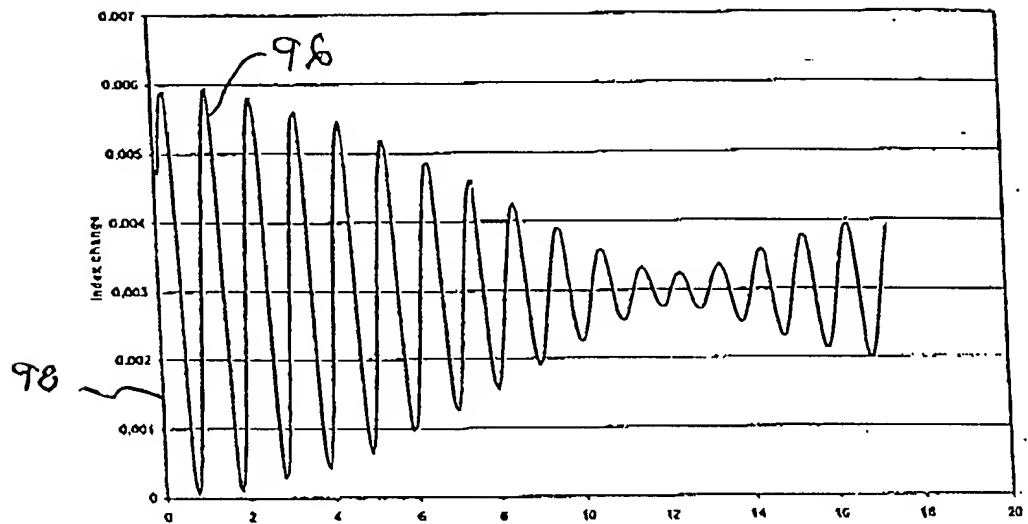


FIG. 28

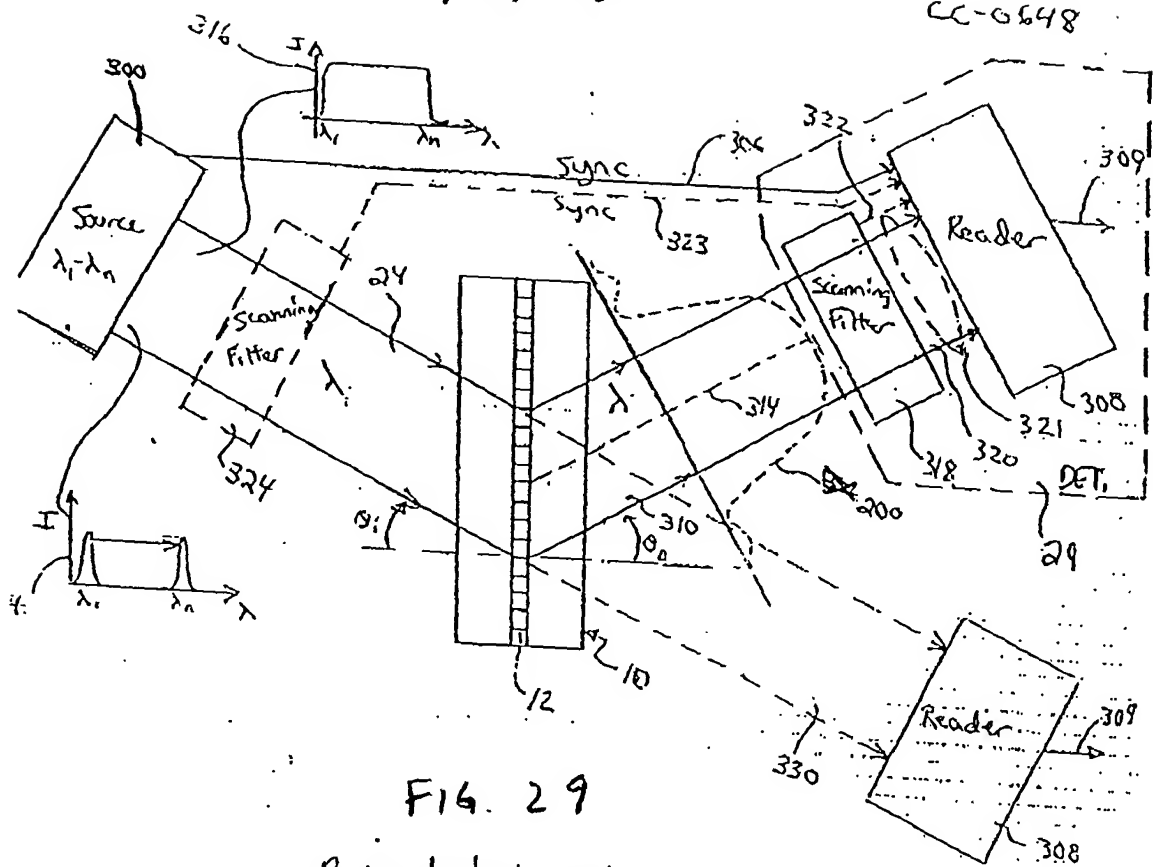
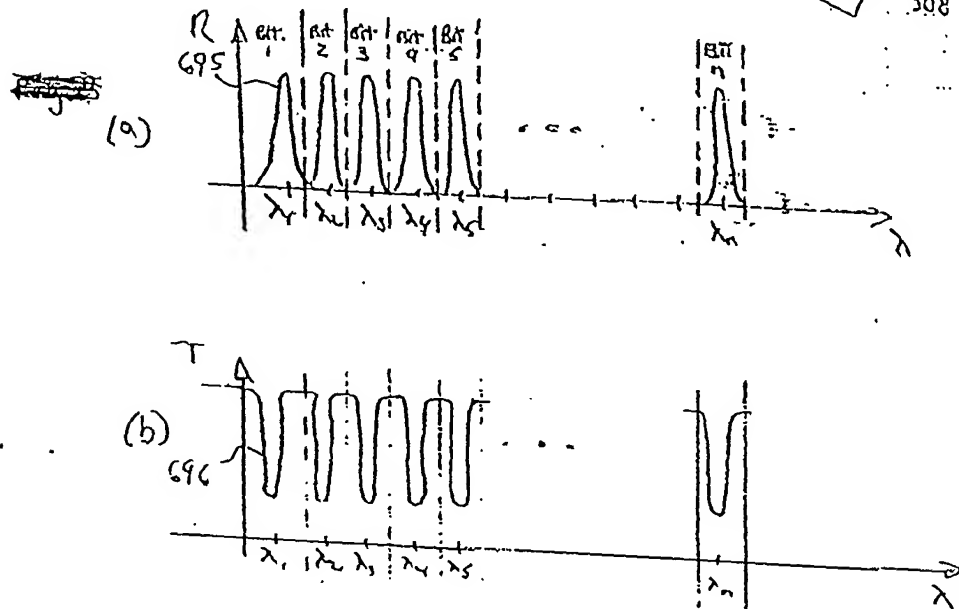


FIG. 29



CC-0648

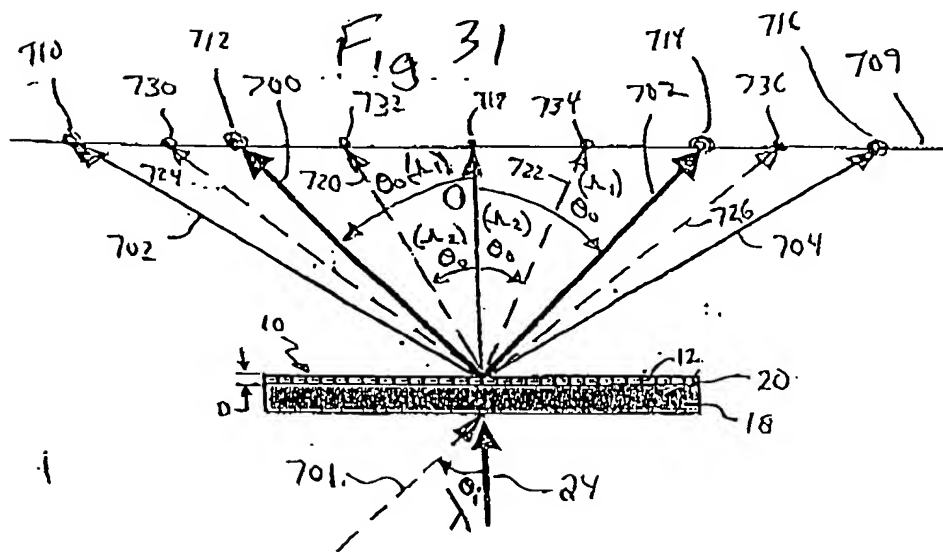


FIG. 32

CC-0648

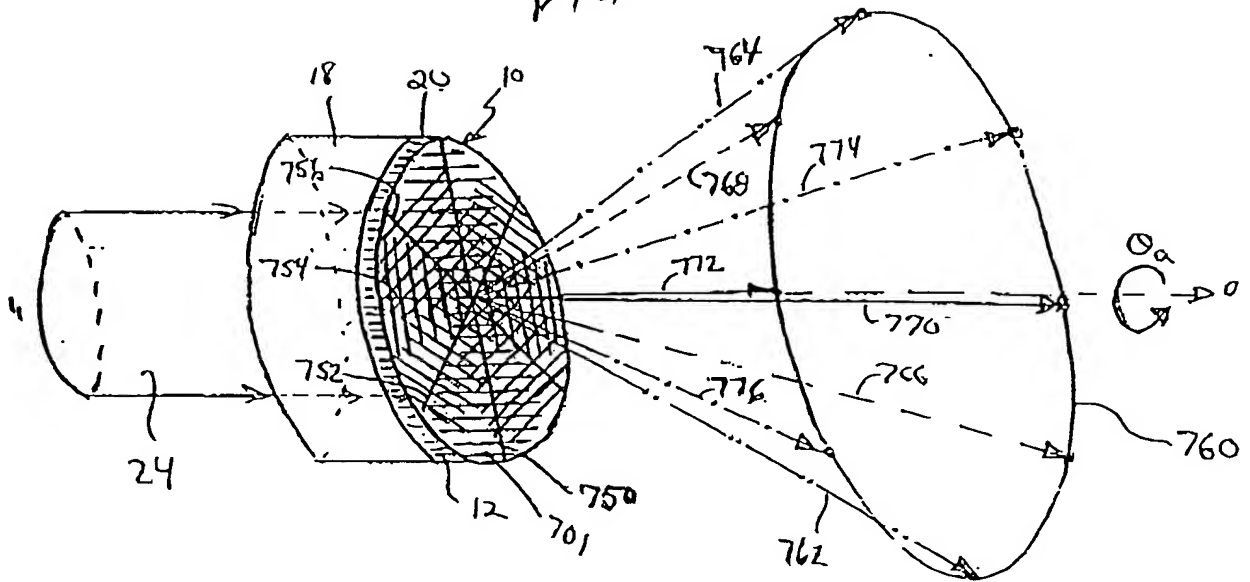


FIG. 33

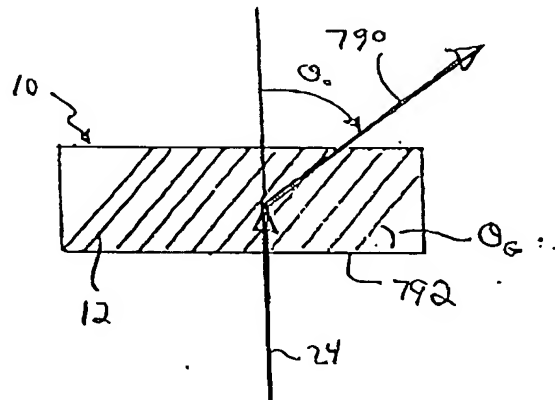


Fig. 34

CC-~~6578~~

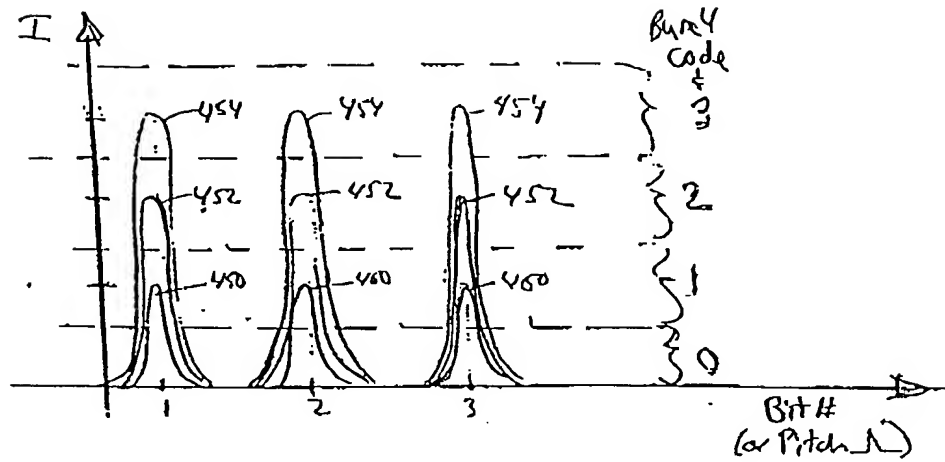


Fig. 35

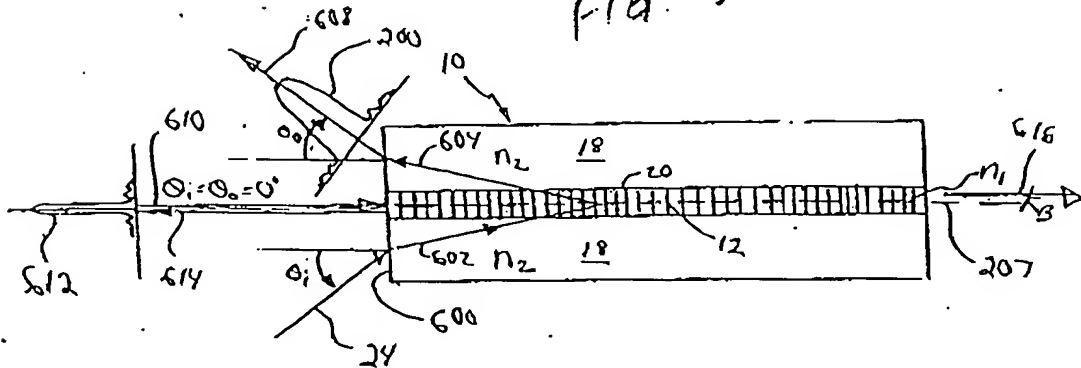


Fig. 38

CC-0.5510

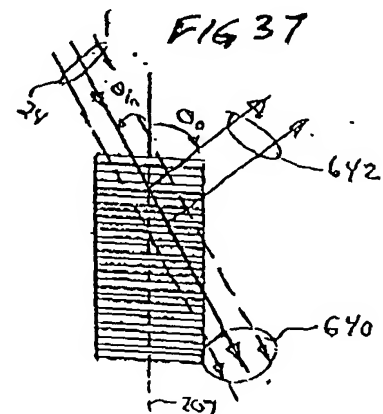
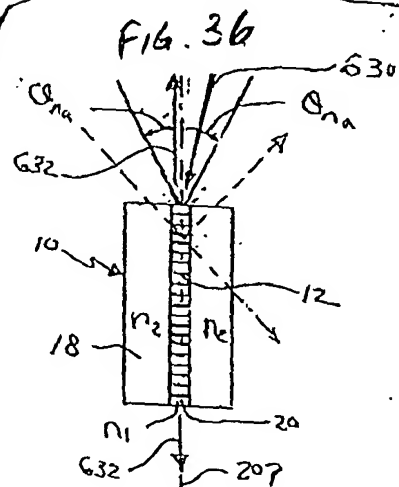
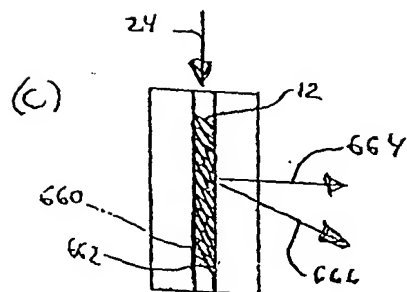
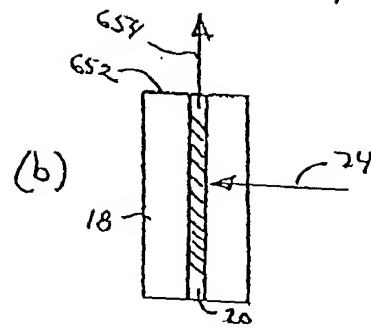
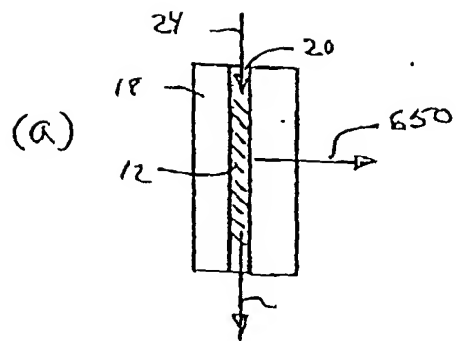


FIG. 40

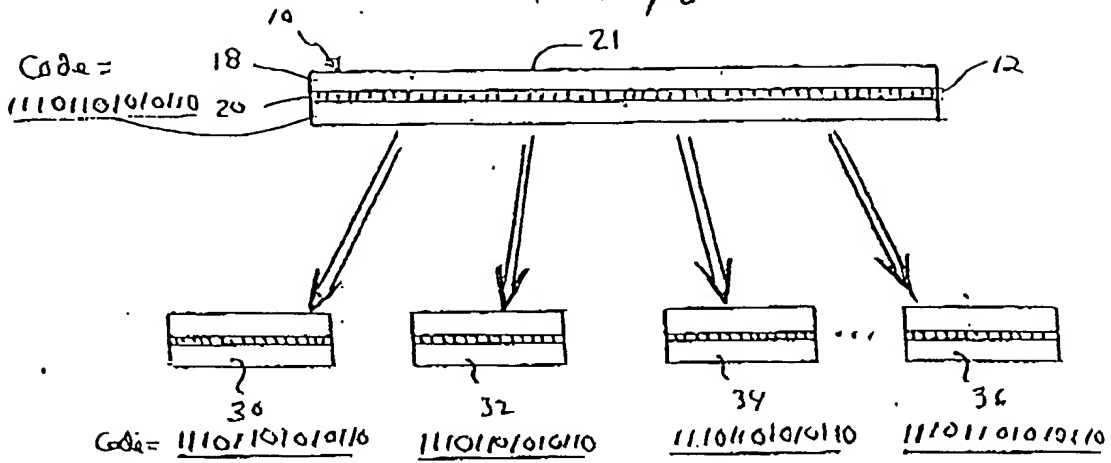


FIG 42

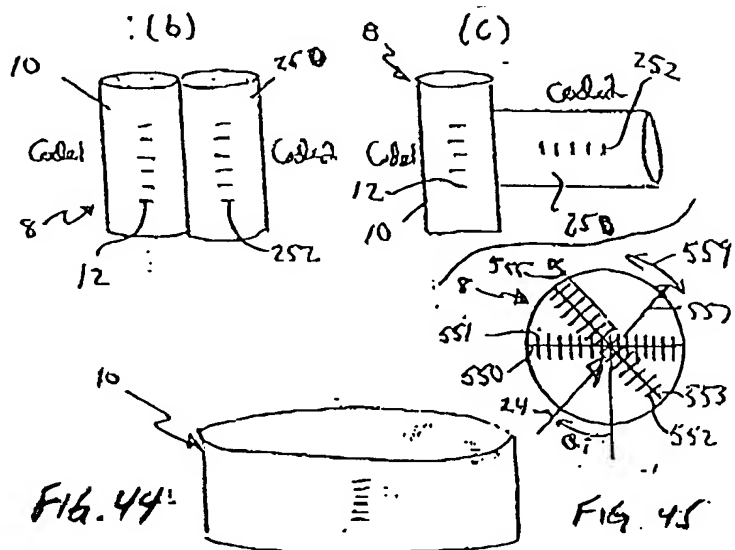
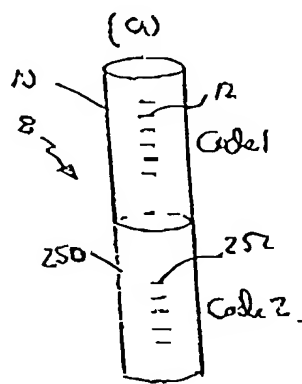


FIG. 44



FIG. 45

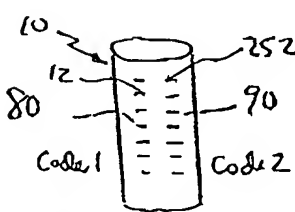


FIG 43

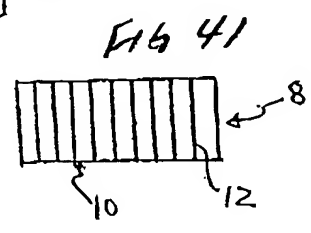
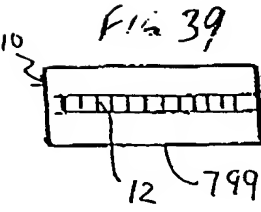
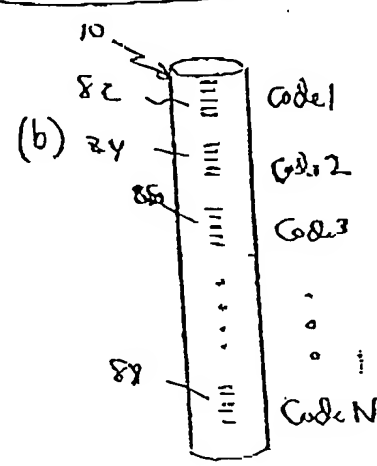


FIG. 46

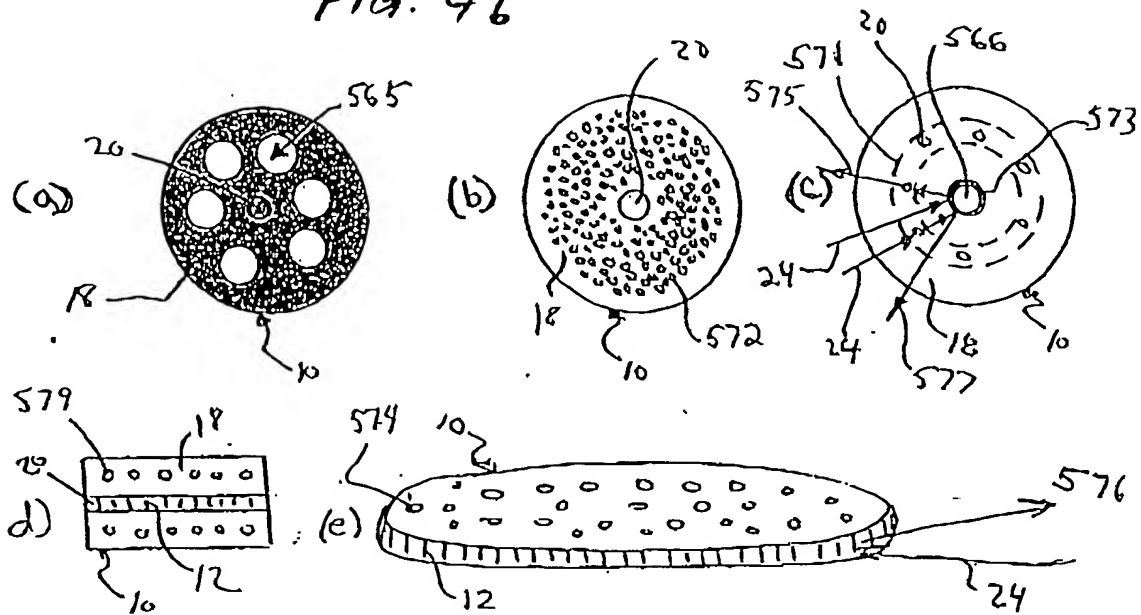


FIG. 47

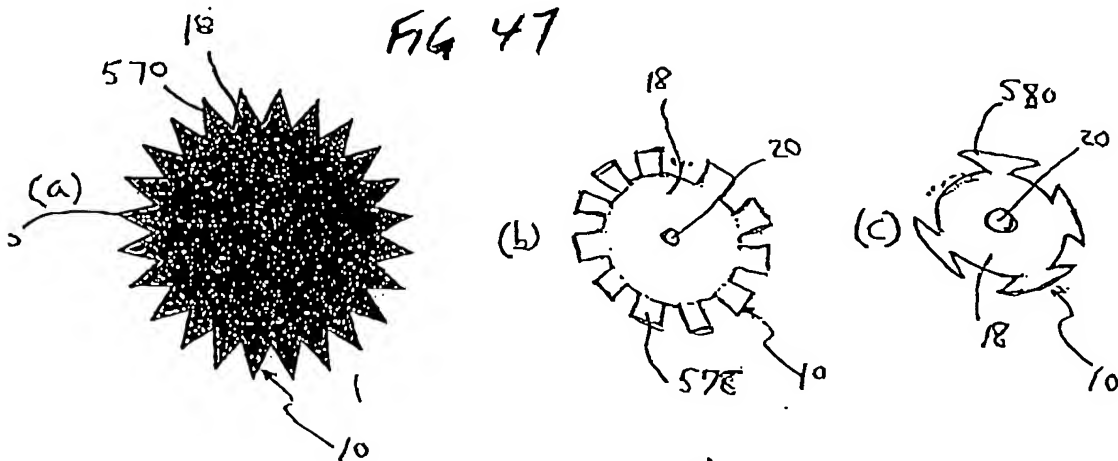


FIG. 48

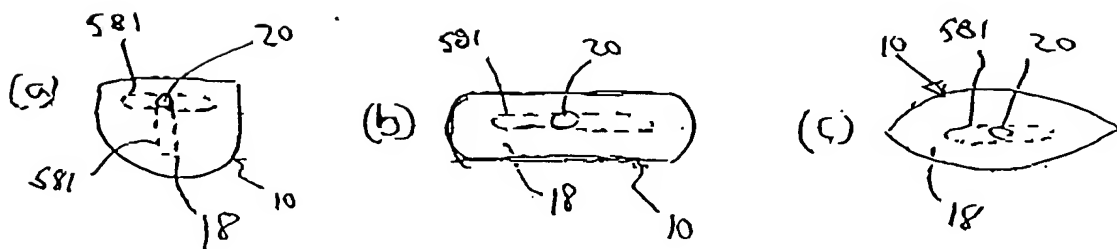


FIG 49

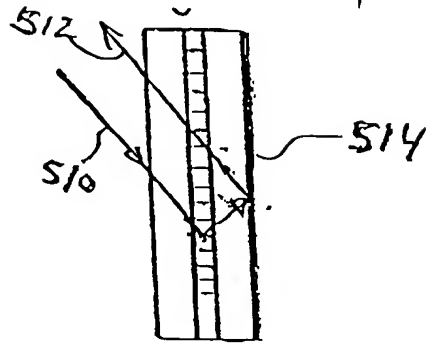
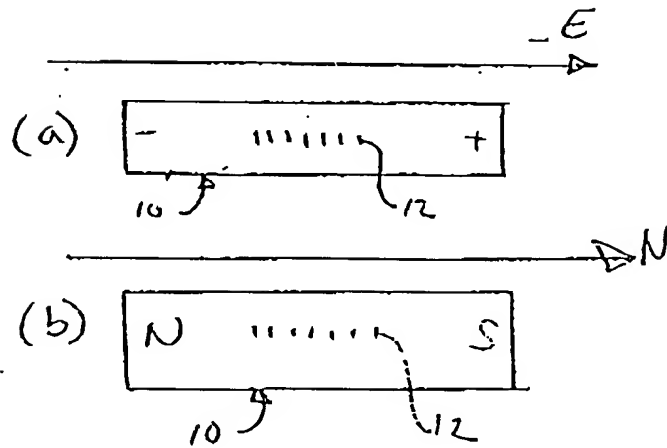


FIG 50



- V-Groove tray built

- Read from:

Flat  
retro  
reflector

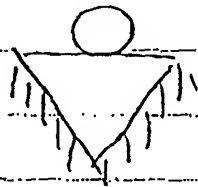


FIG. 51

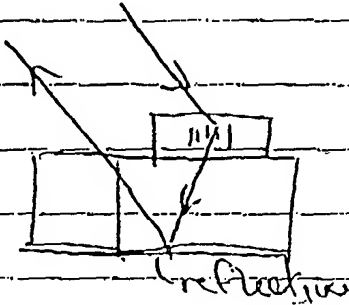


FIG. 52

Read  
thru V-Groove

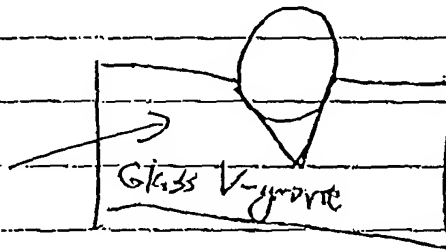


FIG. 53

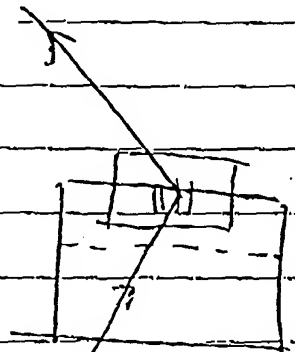


Image  
Through  
V-groove plate

FIG. 54